NOTES ON THE GEOLOGY
OF THE
GULF OF ST. LAWRENCE

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JOHN M. CLARKE

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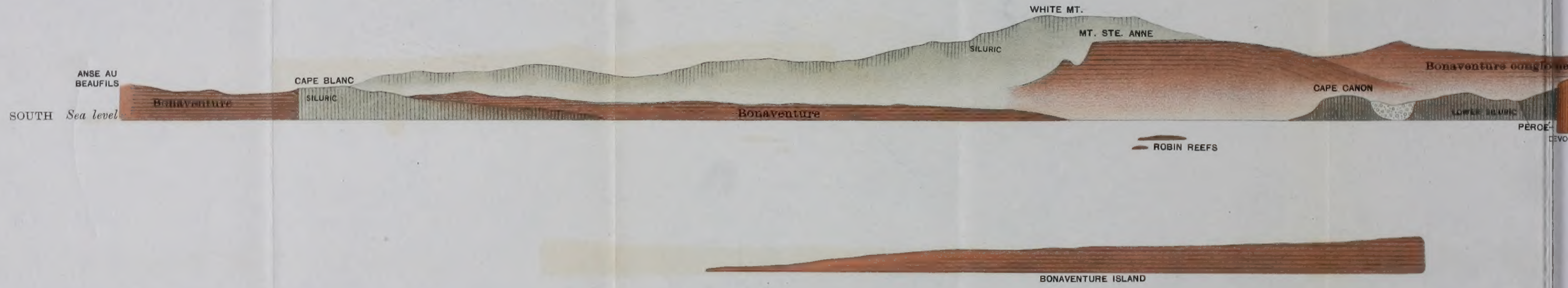
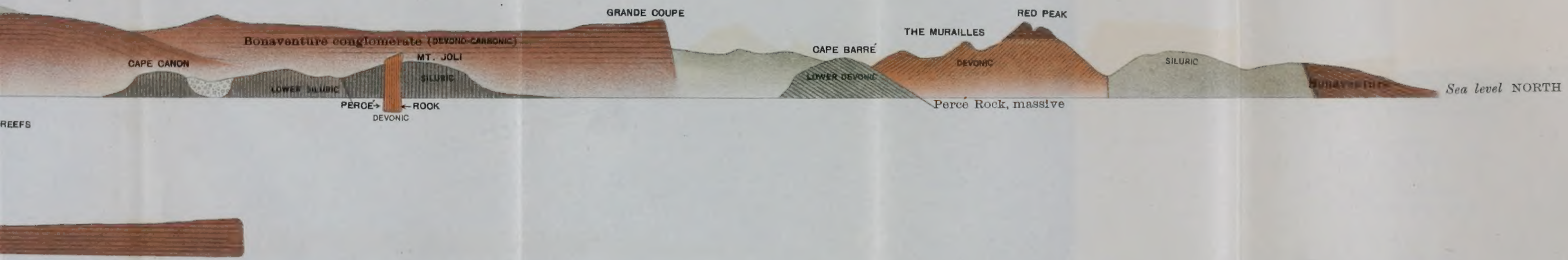
PANORAMA SKETCH OF THE SEA FRONT AT PE



A SKETCH OF THE SEA FRONT AT PERCÉ



NOTES ON THE GEOLOGY OF THE GULF OF ST LAWRENCE

BY JOHN M. CLARKE

As opportunity has afforded during the summer months the writer has continued his observations on the geology, principally of the Paleozoic formations, lying about and within the Gulf of St Lawrence. Not all the notes and records made are yet properly digested and fitted into their sequence in the geological history of this region, but there are some which extend and fortify my earlier researches and others which illuminate the investigations of earlier workers in these fields. The more tangible of these records are here brought together as an expression of progressing knowledge which it may be hoped will eventually give us a clearer conception of the development of this interesting region and of the causes producing the gulf itself.

I

THE RELATIONS OF THE PALEOZOIC TERRANES IN THE VICINITY OF PERCÉ

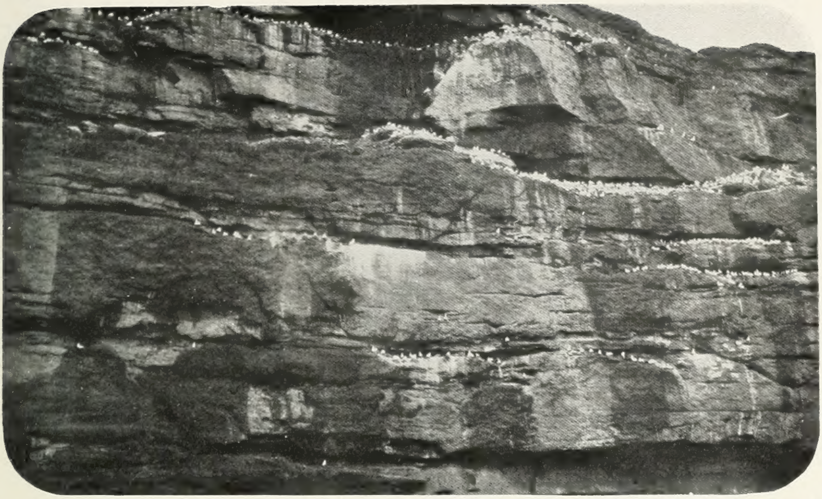
Percé is a region of boundless geological variety and interest. The writer feels that he has, in previous publications, only intimated its history, the details of much of which must be left to future students of the region, particularly that part of it lying back of the coast mountains. But in order to portray in panorama the relations of the Paleozoics here represented in a way that may help to clarify the situation, in the accompanying sketch a liberty has been taken with this irregular coast line by stretching out all its angles, headlands and bays into a straight line, so that, regardless of the unavoidable distortion involved, the eye may grasp not only the attitude of the rocks but their relative history. This section, which will be taken as only an approximation to accuracy of expression and whose discrepancies are freely avowed because of stretching a right angle into a straight line, is about six miles in length, unequally foreshortened at the north end, and extends from near Cannes des Roches at the north to the vicinity of l'Anse au Beaufils at the south. The point of view is out to sea east of Bonaventure Island, from the edge of the 50-fathom line which along this stretch of coast makes a deep bay inward toward this island (see Hydrographic map, p. 14, N. Y. State Mus. Mem. 9.

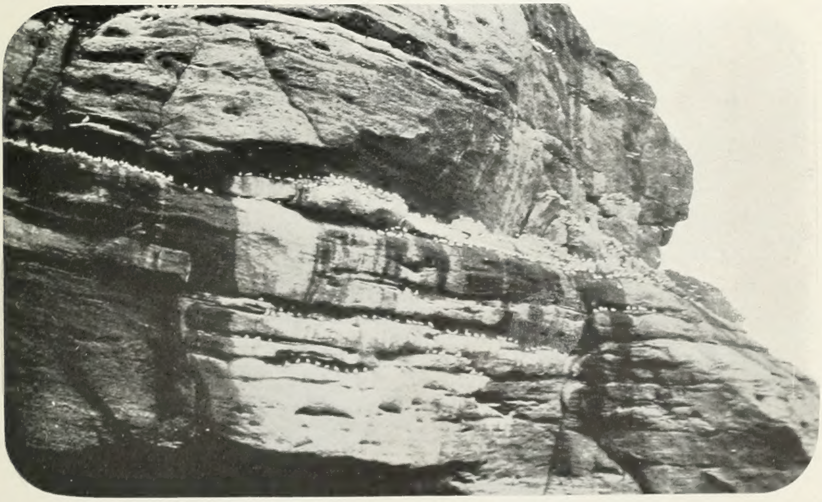
v. 1 Early Devonic of Eastern North America, 1908). This 50-fathom line is a submarine terrace at this point, one of the steps leading down to the great cut in the Bonaventure rock plateau made by the channel of the St Lawrence river. What is actually exhibited in this sketch is the present stage of the attack of the gulf waters on the folded and unfolded rocks of Percé, supplemented by the outstanding fault faces of the mountain cliffs and by the general effect of weathering denudation.

A contrast of fundamental moment lies in the attitude of the younger and older rock beds; the former horizontal or gently undulating, the latter simply inclined and, on the south front, vertical. A fact of similar moment is that the latter, consisting of Lower and Upper Siluric and Lower Devonic, are exposed in jutting cliffs by the removal of the mantle of softer beds from over them.

Bonaventure sands and conglomerates. These beds lie today much as they were originally laid down in the shallow waters of a rough coast which must have been not greatly unlike, in its broken rugged cliffs, the coast of Percé as it is now. I believe the Bonaventure series of beds, at least so far as we can distinguish it from the Gaspé sandstone series, or so far as it can be defined from its original section on Bonaventure Island, represents in time the latest stage of the Devonic and possibly the earliest of the Carbonic. We can not prove the latter affiliation from any evidence around Percé, nor indeed is this age demonstrable from intrinsic evidence at any point throughout its distribution from Gaspé bay to the head of the Bay of Chaleur. We have been in the way of deferring to current opinion in this matter, but can now go no further than to recognize an interval between this deposit and the earlier Devonic of the country, often intensified by down-faulting, the absence of any marine later Devonic and the continuity of this mass of sands and conglomerates as an accumulation of landwash along a bold upturned Precambric and early Paleozoic coast. I have had occasion before to refer to the fossil-bearing pebbles of this conglomerate,— Cambric, Siluric and Devonic; heads of Halysites often of large size (that here figured is from the cliff face on Bonaventure Island); fragments of the Gaspé sandstone and of the Percé Rock massive with their characteristic species. There is some order in the assortment of these pebbles, for there are as a rule few jaspers and other crystallines mixed with the limestones and few fossil-bearing blocks where the crystalline pebbles abound. Logan records a block in this conglomerate weighing upward of eight tons, but while such large ones are not familiar to my observation there is plenty of

Plate I





Bonaventure conglomerate; Gannet cliffs of Bonaventure island

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similar evidence that large, usually angular, masses were thrown down by seasonal freezing and thawing in the sea cliffs of those old days.

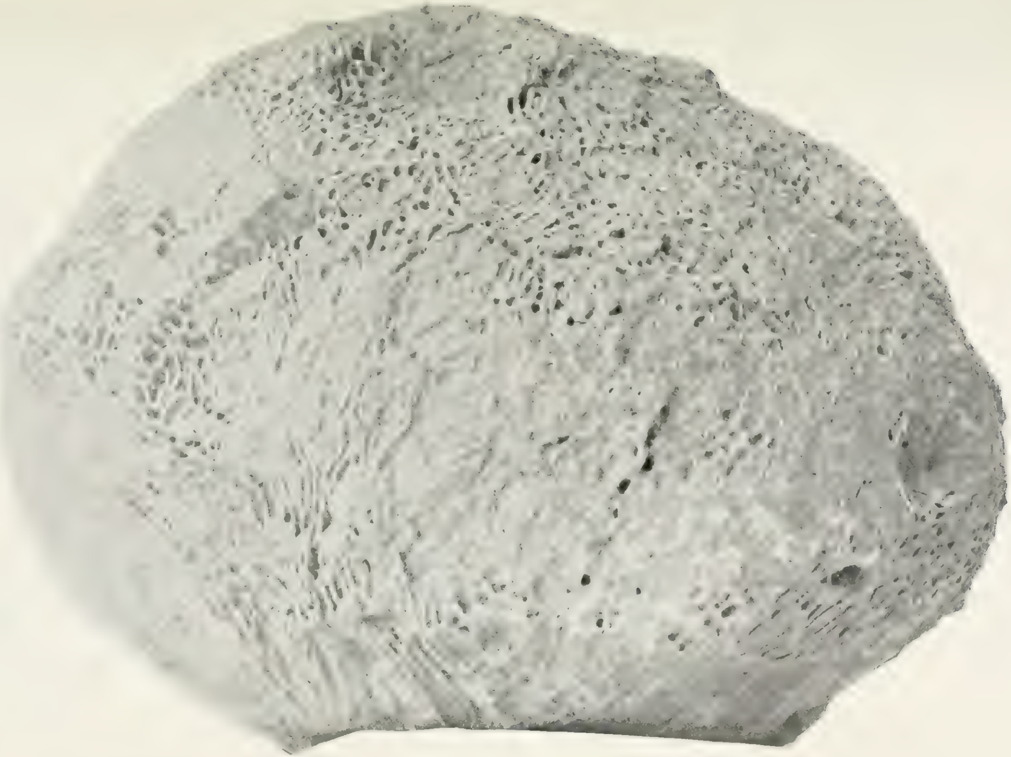
While these red Bonaventure rocks have undergone but slight deformation, it is their noteworthy down-faulting that has given to Mt Ste. Anne and its outlying cliffs their peculiar impressiveness. Ste. Anne rises, back of the sea cliffs and terrace of Percé, in a vertical east face from which has parted and, as I take it, slid down to lower level, that portion of the original mantle represented now by Bonaventure island and by the Robin reefs which the waters of the " Channel " have not yet washed away. Ste. Anne was once the " Table-a-rolante," and its gently rolling surface slopes downward to the north; but passing this, the observer is abruptly confronted by a second majestic fault scarp, the Grande Coupe, over whose smoothed face the water falls in vertical wavering lines to a level as low as the road, thence following to the sea a second fault plane which traverses the older rocks in a line at right angles to the Grande Coupe. This scarp faces north. Again at the back of Ste. Anne facing the south and west is an even more impressive fault cliff, the " Amphitheatre." Cut off thus by three bold fault faces, this mass of Bonaventure conglomerate is peculiarly isolated. The mountains roll up to greater heights westward of these undulating surfaces of Ste. Anne, but except for the first range, known as White mountain, their composition is as yet little understood. There is no area of these Bonaventure rocks known to me along the coast from there up the Bay of Chaleur, where this mode of bold faulting has been repeated, nor is there any very satisfactory evidence that the down-breaking of Mt Ste. Anne on at least three sides has involved the lower rocks on which it rests. These lower and older rocks constitute the very heart of appalachian upfolding and made a most irregular and unstable floor for the conglomerates, which may account for the manner in which the mantle has broken asunder without great distortion. Remnants of the down-thrown blocks still lie on the land; one constitutes the shore front in a strip reaching from the Robin beach south to Birmingham's hill; another lies beyond the vertical limestone of Cape Blanc, where there is a sharp fault against the latter, with evidence that the edges of the conglomerates have been dragged downward; again, way at the north end of the section at Cannes des Roches, is a tipped block lying at fault with the Siluric, while the very top of Red peak, the highest point overhanging the Malbay, seems to be an outlier of the Bonaventure limestone-conglomerate resting on the upturned angles of the Percé Rock Devonic; this too has presumably been separated from the parent mass of Ste. Anne by a fault.

One additional fact is here worthy of record. Overlying the slopes of Mt Joli, particularly the south flank, is a very thin mantle of a gray unfossiliferous shale, whose attitude is apparently at right angles to those vertical beds. What is present is a mere residuum reduced to little more than a film but it seems to be a remnant of some gray shale that pertained to the Bonaventure series and has been broken up by weather. I would make this intimation with reserve, as it is possible that this thin accumulation has some later origin.

The vertical rocks. It is in the matter of attitude that the great contrasts of this coastal geology lie. On all the southward stretch from the angle of Mt Joli, the old rocks are but very little out of the perpendicular, standing with an inclination of 80°–85° s. This is true of all the Siluric shales and thin limestones of Mt Joli and Mt Canon, of the highly colored Devonic of Percé Rock and of the red and white limestones of Cape Blanc. On the north limb of the coast angle these older strata are less uniform in attitude and more faulted against each other but all steeply inclined. Throughout the complete series, however, there is a multitude of displacements, to which I have previously given some attention. Denuding these earlier rocks of their overburden, one finds the basis on which to restore the pre-Bonaventure appalachian upfolding, which has received its essential shove from the south, as the arm of the great mountain system here curved itself toward the east. All the capes and promontories of the coast lie where the more durable vertical rocks have stood against the sea, while the softer Bonaventure mantle was destroyed. These various Paleozoic rocks and their contents have been already pretty freely discussed by the writer and on this occasion it is desired only to consider somewhat more fully the character of the *cliffs at Cape Blanc and their extension into the White mountain.*

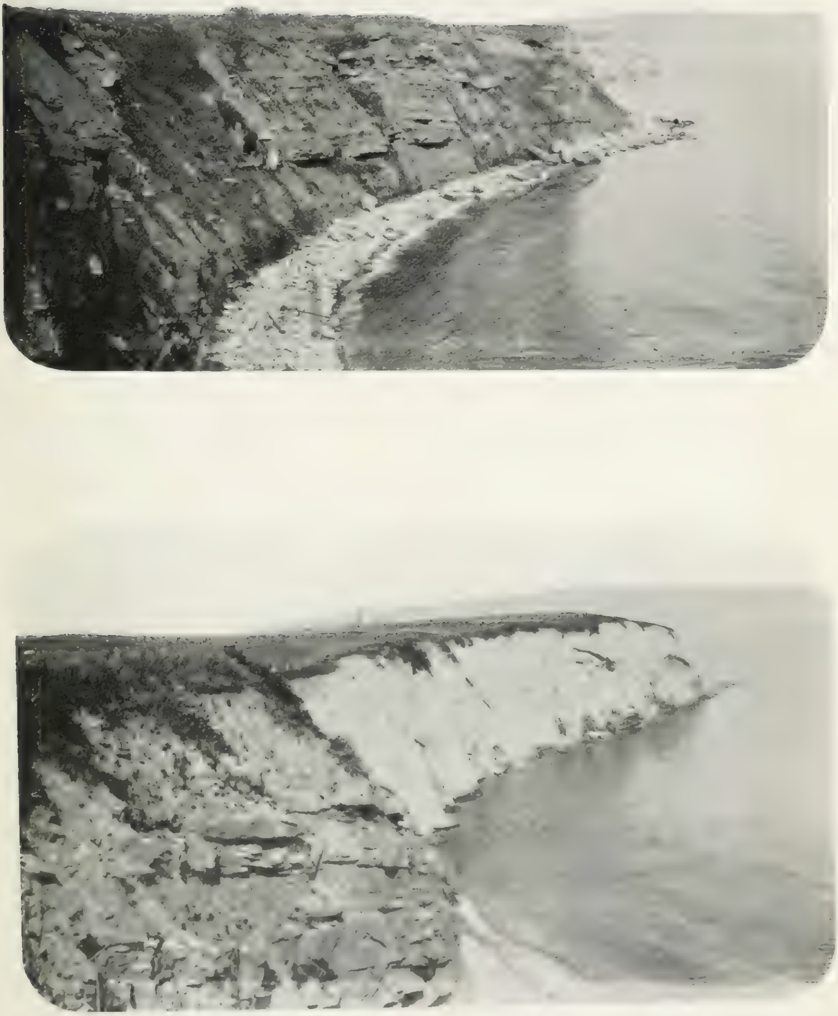
The overlap of the red Bonaventure sands and conglomerates on these vertical limestones is beautifully seen on this sea front. Unfortunately these cliffs are very difficult of access except in a calm sea, for they run sheer to the water with only a little beach here and there north of the cape. From above they are quite out of reach. The northernmost part of the vertical series, especially where covered by the red Bonaventure, is deeply stained red and green, but the color has not been derived from the rocks above.

Plate 2



Colony of Halysites — a boulder from the Bonaventure conglomerate, Bonaventure island. Length of original **10** inches.

Plate 3



Cliffs of Cape Blanc or Whitehead, Percé, viewed from the south. In the foreground horizontal red Bonaventure sandstone; the cape is composed of vertical gray-white Siluric-Devonic beds

The basal mass of the Bonaventure here is wholly of deep red, soft sands, the conglomerates not appearing for a distance of some 30 to 50 feet higher. The vertical beds below, beginning at the north, are alternating shales and thin sands with thin limestones, the shales dark, the limestone bands red, green or blue. Southward the color is lessened and the beds become a gray white as they approach the point of the cape where the lighthouse stands. Beyond the cape the white beds and the entire series is terminated by downfaulting against the red Bonaventure rocks beyond them. The thickness of this vertical series of limestones is from 1500 to 2000 feet without much evidence of loss from internal faulting; and in attitude the beds fully conform to those of the Percé Rock and the Mt Joli series. I have before shown that the fossils of these beds are distinctively Siluric and the lists I have given indicate now a Lower Siluric age for the southernmost or whiter layers and a later stage for the northern, more highly-colored series. This condition, if correctly inferred, seems to imply an overturn of the strata, but much still remains to be learned from the fauna. The fossils are not especially abundant, not often clearly preserved and rather difficult to acquire, but the acquisition and subdivision of the fauna of the series remains an interesting problem. This limestone massive inshore affords exposures along Birmingham's brook and thence on toward Irishtown, rising gradually into the ribs of White mountain, skirts the rear of the Ste. Anne plateau in higher elevations, shows itself at Corner of the Beach and comes out to the Malbay shore in that vicinity (shown on the section here at the north end). It thus encircles the entire series of Siluric, Devonic and Bonaventure rocks about Percé, and forms the outstanding wall of an ancient basin within which the Bonaventure rocks were here laid down. We have as yet no reliable evidence that these Bonaventure deposits extended westward beyond this rock wall.

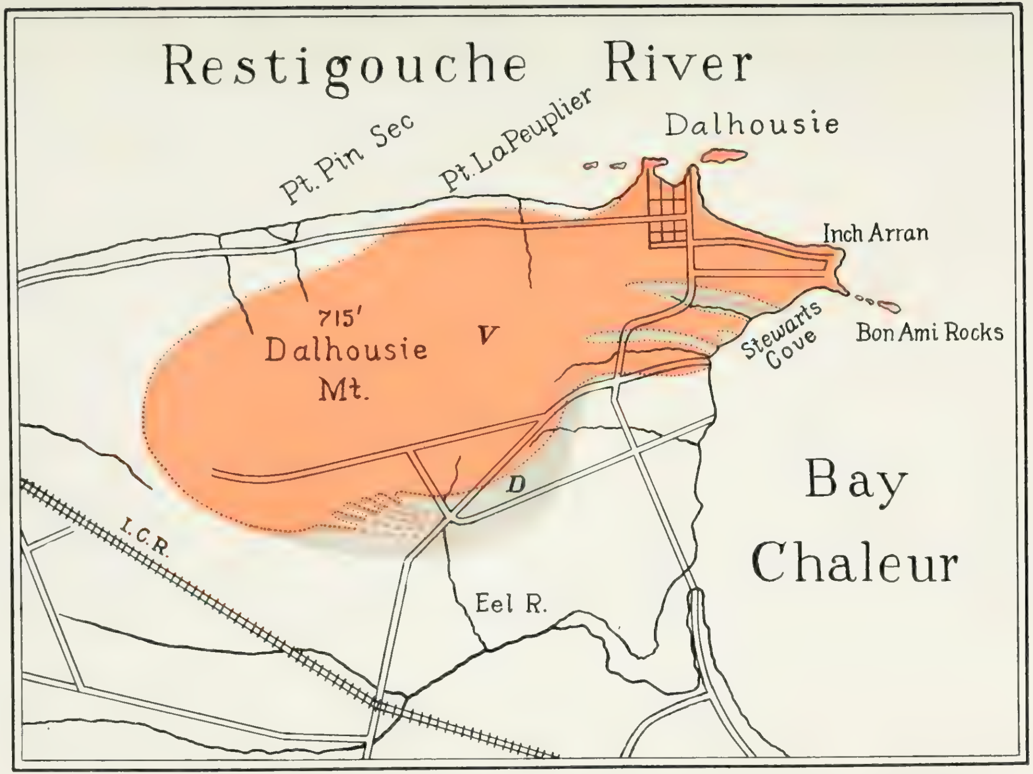
II

ERUPTIVE CONTACTS IN THE MARINE DEVONIC DALHOUSIE BEDS AT DALHOUSIE, NEW BRUNSWICK

This mass of soft and highly fossiliferous shale has been described at length and its fossils fully discussed in the second volume of my memoir on the Early Devonic of Eastern North America (1909). I have more recently had opportunity to examine the extension of these beds from the shore exposure at Stewart's cove, inward or westward toward Dalhousie mountain. It is necessary here to restate briefly the interesting geological relations in order to bring out the pertinence of my present remarks. Dalhousie mountain lies a mile or so back from the shore of the Bay of Chaleur at Dalhousie and appears to be a large boss of eruptives from which apophyses extend eastward into the sea, a large arm reaching down through the village and projecting as two points at the waterfront, thence extending continuously to the lighthouse at Inch Arran, covering the Inch Arran beach, including the islets known as the Bon Ami rocks, and therefrom reaching to the opening of Stewart's cove. This heavy lava mass is interesting for its great inclusions of crystalline blocks which are finely displayed in the bluff below the Inch Arran light. These inclusions are of various composition, pink and gray syenites prevailing, and in this much weathered rock face where the decomposition of the lava has spread radially from their surfaces, the cliff looks as though it had been shot full with great missiles whose impact had fractured the matrix.

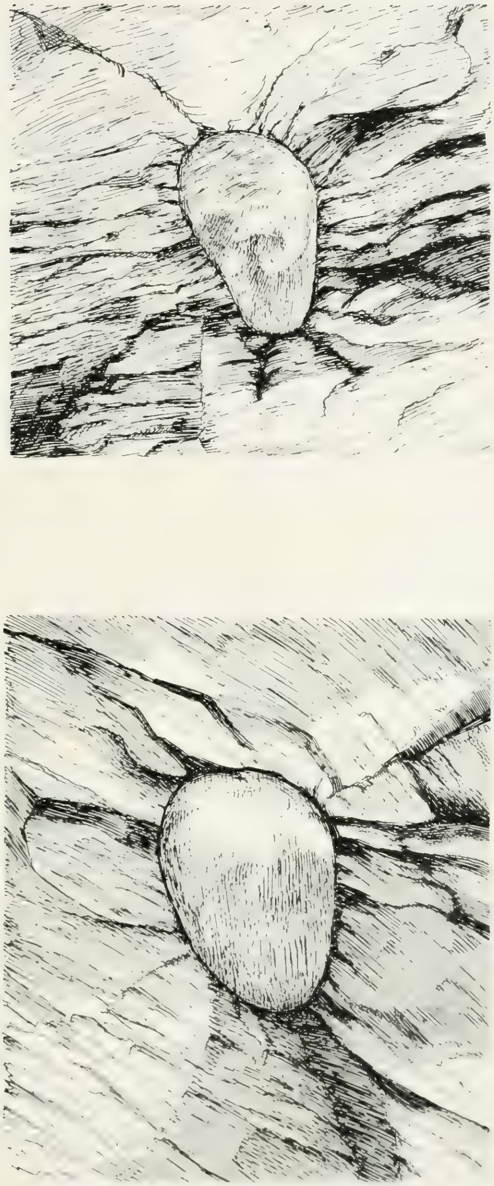
At the south end or bottom of this mass begins an exposure of the upper inclined fossil-bearing Dalhousie shales, the contact being buried under the beach sand and the highest beds, which are coral limestones, being exposed only at extremely low water. Continuing several hundred feet along the shore cliff wherein are one or two thin ash beds, the shale series is cut by a second volcanic mass at the mouth of Stewart's brook where the contact is sharply defined and its effects manifest. The front of this second volcanic mass is a fifth of a mile long and near its midlength lies a large but quite clearly embedded mass of the shale, whose precise position in the series is not entirely certain. At the bottom or south end of this lava mass the lower section of the shale series appears and continues for several hundred feet more. Its base (beds with Gypidula pseudogaleata) lies on a floor of volcanics which, on the shore section, terminates the sedimentaries. The entire section of Devonic sediments here is measured at about 450 feet, without evidence of repetition in its parts, and it is actually cut but once by the volcanics. These extrusives were contemporary with the deposition of the sediments, and it seems probable that they are actually connected as apophyses with the mass of Dalhousie mountain as represented on the original map of this region by Dr R. W. Ells (1884). Here on the shore front the volcanic masses are very heavy and their contact effects are shown by the induration of the shales, the whitening of the calcareous fos-

Plate 4



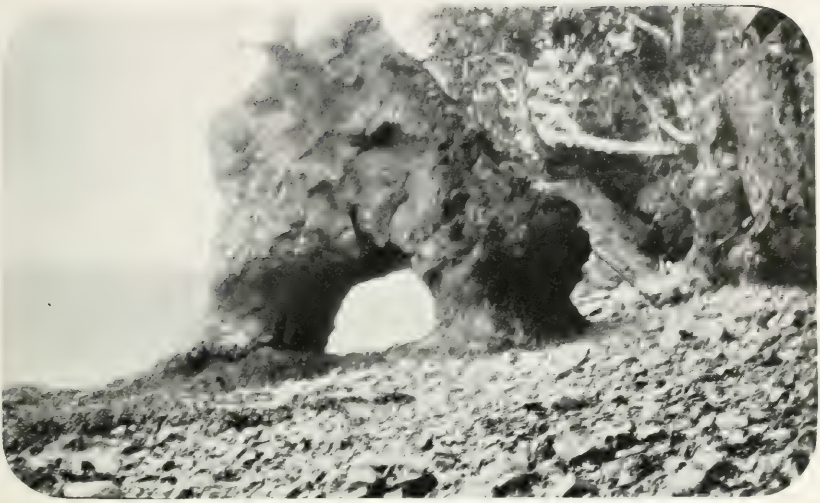
Sketch map of Dalhousie showing the relation of the eruptive mass (V) and its apophyses to the Devonic marine sediments (D)

Plate 5

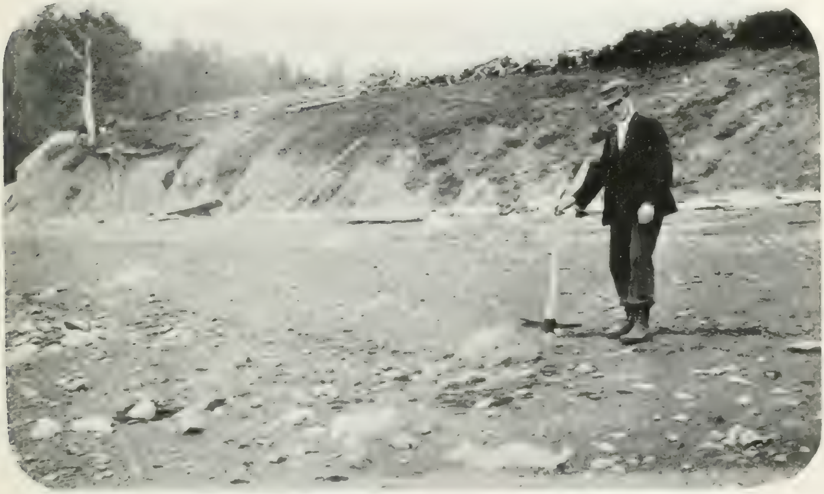


Inclusions of syenite in the diabase at Inch Arran light, Dalhousie

Plate 6

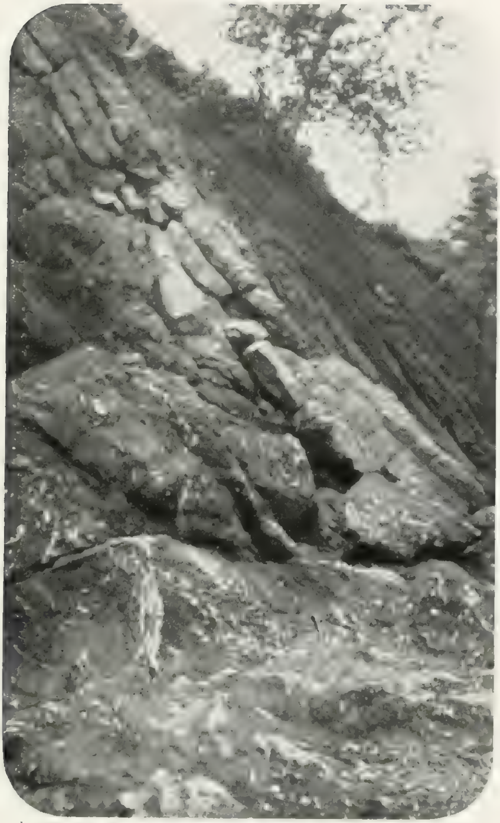


Dalhousie—Gateway to Fossil cove—an arch of eruptive rock



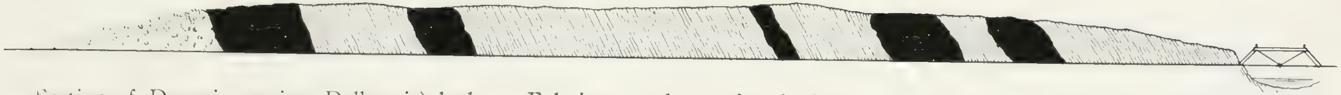
Dalhousie—Fossil cove at very low tide exposing about 25 feet of strata at the top of the series, largely coral beds not before recorded. The pick is resting on the uppermost layer.

Plate 7



Contact of fossil-bearing beds (above) with the eruptives (below). The soft calcareous shales are baked into limestones. Fossil cove, Dalhousie.

Plate 8



Section of Devonic marine (Dalhousie) beds on Eel river road, 202 feet in length, showing five interbedded masses of volcanic tuffs and ashes. The dip of the unaltered fossiliferous beds is indicated and is to the north.

sils and the deposition of secondary calcite. There is no breccia formed as the sediments were not sufficiently hardened at the time of the outpours to produce a breakage of this character.

Back on the heavily wooded mountain there are no traces of any other rock than the eruptive and the only clues that I have obtained as to the inward extension of these almost ruined masses of Devonic rocks are located along the road southward to Eel river, which runs with some deviation parallel to the coast but at a distance of three-fourths to one mile back. The rock cuts along this road complete without simplifying the relations of the sedimentaries and eruptives.

Sediments and eruptives in the Eel river road section. On consulting the adjoining sketch map there will be seen an east and west crossroad reaching from the shore to the Eel river road and passing along the main eruptive mass. Turning south on the Eel river road the remaining width of the volcanic is soon passed and the road cuts a series of red sandstones, followed by dark reddish shale and yellow decomposed limestone. The shale has produced a peculiar fishplate which competent authority has thought may be Pteraspis or an ally, and the decomposed limestone is profuse in Ostracodes, of which there is abundance in similar position on the shore section. The shore, however, has produced no red sandstone, no reddish shale and no fish remains. The outcrop of the sedimentaries is here not more than 50 feet in entire length; then follows the eruptive which is not interrupted until the road crosses the bridge over Stewart's brook and in a west curve takes the next rise. In a position which corresponds to the lower or south section on the shore there is shown in this road a slight extent of similar Devonic shale. From this point on, all correspondence in the shore and road section is lost, for on the shore the sediments have ended. One continues on the highway, however, over the hill, crossing the second bridge beyond the house of James Stewart and here begins the section which is seen in diagram on the following plate. Here the outcrop face is 202 feet long; its sediments are all normally and steeply inclined to the north as on the shore and are crossed by *five* distinct beds of contemporaneous lavas, tuffs and ashes. The contacts of the sedimentaries with these thin ejections are absolutely unaltered; indeed here, as on the shore section, there are ash beds in which the fossils lie unaffected. Evidently the thin volcanic masses carried too little heat to effect any change in the sediments lying in cool waters, only the heavier outpours seen on the shore section radiating enough heat to produce any contact changes.

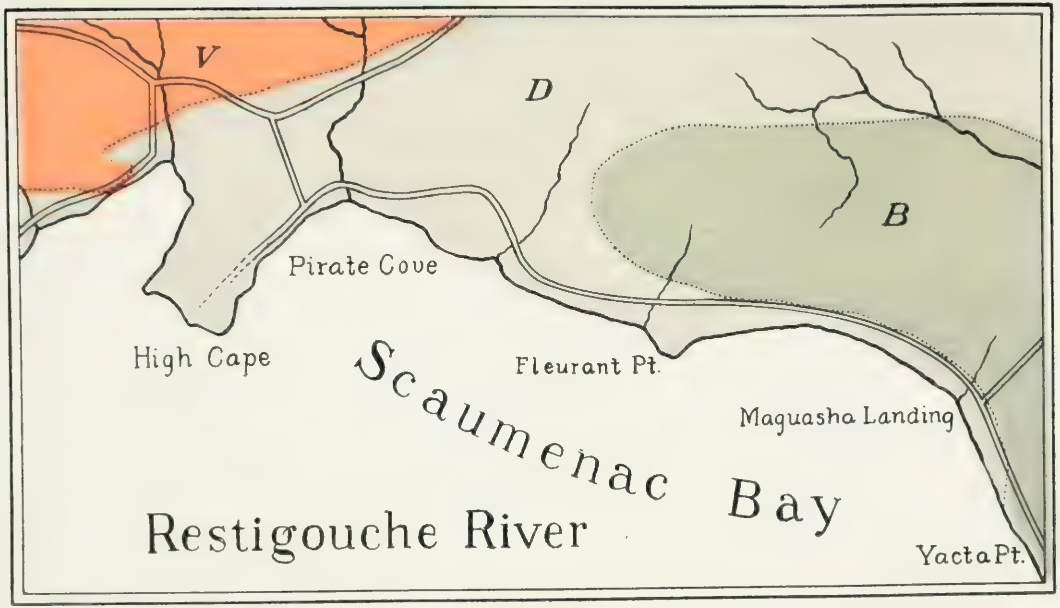
On the accompanying sketch map the distribution of the sedimentaries and their accompanying volcanics are indicated as now known. It presents an occurrence of singular and unusual interest.

III

STRATIGRAPHY OF THE DEVONIC FISH BEDS AT MIGOUASHA, PROVINCE OF QUEBEC

The fish-bearing beds of this region are probably the most remarkable of any Devonic deposits known in respect to the abundance and excellent preservation of their fish remains. These have entered into the literature of paleontology extensively and generally under the name of the fishes or beds of Scaumenac bay, Escuminac, Fleurant point or Yacta point. In view of the polynomial character of the region it is well to be explicit. These beds lie on the north shore of the Restigouche river where it broadens into the headwaters of the Bay of Chaleur. Their location is straight across the water from Dalhousie, N. B., whence a ferry runs to what is known as Migouasha landing, where the rock wall of the bay is degraded to the water. At a quarter of a mile east of Migouasha landing the red rocks of the "Bonaventure" formation come down to the water in an eastward dip, and at about three-quarters of a mile westward of the landing is the projection of Fleurant point. The high-colored "Bonaventure" beds rising from the water line at the east, present a contact with the underlying gray fish-bearing beds for a distance but on passing Migouasha they retreat into the hills of the background and all the rock beds exposed thence westward to Fleurant point are the gray sands and shales with fish. In the voluminous literature relating to the contents of these rocks little has been recorded as to their stratigraphy and the essential evidence which has led to their general acceptance as Upper Devonic has been brought out by Doctor Ells's account of the locality given thirty years ago. These gray Devonic sands with their nodules of various sizes, carrying Bothriolepis, Scaumenacia and several other fishes in extraordinary preservation and the blocky masses filled here and there with their remains, attain a considerable thickness at the highest point along the stretch of coast, perhaps a clean exposure of 100 feet and, in view of their dip eastward, a total thickness of not far

Plate 9



Sketch map of the Devonic fish locality at Migouasha. V Eruptives; D–Devonic; B Bonaventure

from 200 feet. This region is the Scaumenac bay of the reports. I have no fault to find with the determination of the age of these beds as Upper Devonic; not only geological relations indicate this but Doctor Eastman states that the composition of the fish fauna itself substantiates this reference. There is something to be said both for and against the assumption that the "Bonaventure" conglomerate of this part of the coast is wholly Carbonic; in fact in its typical development where it fronts the gulf at Percé, it certainly seems to complete the late Devonic interval.

My attention has been attracted to a layer of loose rounded boulders which underlies the fish beds along the shore not far west of Migouasha landing. It is a rather striking accumulation lying together like a mass of till with the boulders rolling out into the landwash. These boulders, which are largely limestone, contain a variety of invertebrate fossils. Some blocks consist only of colonies of Halysites; another single boulder contains Dalmanites micrurus Green (head and pygidium), Camarotechia cf. dryope Billings, a small Leptostrophia, Chonetes and Pholidops and a rather striking species of Cyrtodonta,[1] which indicate a normal marine early Devonic fauna. The boulders and their contents are comparable to the limestone pebbles and boulders of the red conglomerates (Bonaventure) of Percé, though the gray color and comparatively slight thickness

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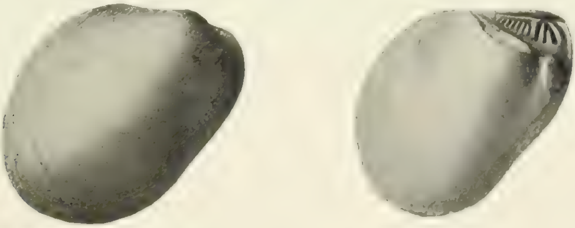
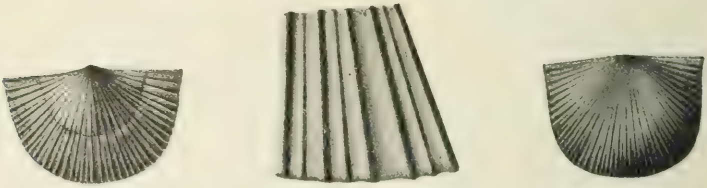
[1] Cyrtodonta gratia—an oblique shell with very low convex valves, not expanding behind, very slight forward extension, giving thus an outline quite usual in the genus though perhaps somewhat less orbicular than in the few species now known in the Devonic of the Atlantic province. The



Cyrtodonta gratia nov. Exterior of right valve and internal cast showing the character of teeth

exterior is closely lined concentrically. The anterior muscle scar is deep and the umbonal teeth strongly developed into a comblike arrangement in which the first and third anterior teeth curve toward each other, enfolding the second; behind these six lesser teeth diminishing in size to the umbo.

of the mass forms a strong contrast. Of course the age of the fish beds depends on the age of the youngest fossil to be found in the boulders of these underlying beds and as yet I have seen nothing later than the Helderbergian. It is therefore possible that the sedimentation of the fish beds began before the opening of the stage we should elsewhere characterize as Upper Devonic. An additional supplementary fact is worthy of record. A large angular block of highly argillaceous black limestone, with a weight of several tons lying on the Migouasha beach above the reach of high tide, has every appearance of having been derived from the rocks of these near-by escarpments. This block contains in some abundance a brachiopod of the genus Schuchertella, and though I have not been able to identify it with species known to me, it is evidently of early Devonic type. Figures of this species are here introduced and the distinctive characters may be given as the coarse, wide apart, rounded ribs, with flat interspaces divided in later growth by intercalary ribs, all the interspaces being traversed by fine longitudinal lines.



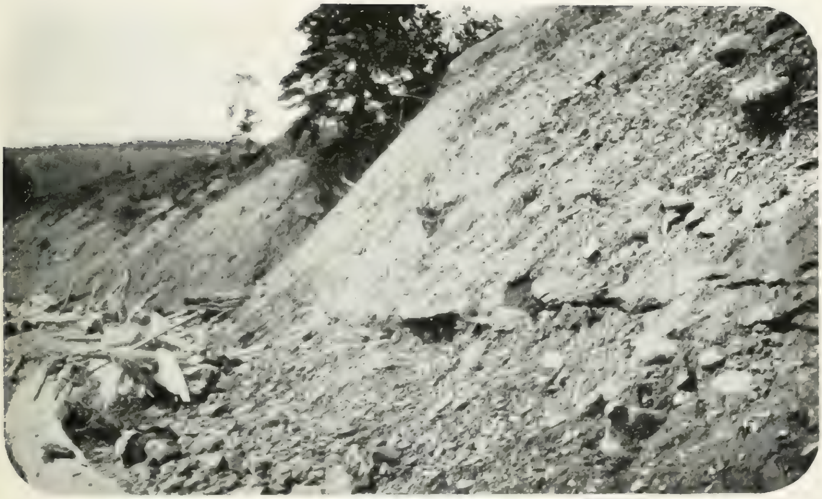
Schuchertella sp. Ventral and dorsal valves with enlargement of the surface. From the shore at Migouasha

IV

HISTORICAL NOTE ON THE LEAD MINES OF GASPÉ BASIN

In my writings on the geology of Gaspé, reference has been made to recent and present attempts on the peninsula of the Forillon to exploit for galena and silver the little calcite seams which fill the joint crevices of the Lower Devonic Grande Grève limestone beds. These efforts began far back in the history of New France and the most serious of them, as well as the most productive, was at Little Gaspé close to the contact line of the limestones with the overlying Gaspé sandstone. It is a singular illustration of the undying persistence of legend in the face of well-established fact that a forlorn hope early dismantled should have revived and been persistently pursued for well nigh 250 years.

Plate 10



Boulder bed with interstratified sands lying beneath the fish-bearing beds at Migouasha. These boulders abound in Devonic and Siluric fossils.

Some years ago there was found among the departmental archives of the Seine-Infèrieure at Rouen the manuscript journal of Jean Doublet. This was edited and published by Charles Brèard in 1883 under the title "Journal du Corsaire Jean Doublet de Honfleur, Lieutenant de Frègate sous Louis XIV." Doublet was a freebooter whose stirring life has put a thrill into every page of this remarkable book. He was the son of François Doublet who in 1663, under concession from the Company of New France, attempted to settle the Magdalen islands and disastrously failed in every respect save that of giving to these islands the name of his wife Madeleine. When this expedition to the Magdalens took place Jean Doublet was seven years old and the little fellow stowed himself away on his father's ship as it left the roadstead of Honfleur, only allowing himself to be discovered when a boatswain into whose bunk he had crawled threw himself down on top of the sleeping boy. The vessel was then well out to sea and the angry father had to take the boy along with him to the Magdalens, fortunately indeed, for it is to him we owe practically all we know of this attempt to colonize those islands. Returning to France at the end of the season, full of promise of success in the fisheries there, the elder Doublet came back to the islands in the spring to find his colony broken up, his stores pillaged and the place wholly abandoned. So this attempt ended in disaster. In 1665 François Doublet, the father, was commissioned by the Compagnie des Indes Occidentales to go for them to the coasts of Gaspé to examine a lead mine about which reports had come to France through the Intendant Talon. M. Brèard says in a note quoted from the Archives de la Marine, Canada (1665), that Talon, judging that the discovery of precious or even base metals was a matter of importance to the king, obtained the right to send to Canada forty workmen. The company recruited these in Normandy and the command of them was given to François Doublet. In addition to the lead, the ingenieur-fondeur believed he had discovered silver on the coast of Gaspé. "The belief seems well founded," wrote Talon.

In "Sketches of Gaspé" (1908) I quoted Nicholas Denys's remarks on this Gaspé mine (1672) in which he says he had known of the place for twenty years, that is as early as 1652, doubtless from reports communicated by the Indians to the missionaries. Indeed as early as 1663 Father Balloquet was sent to look up the place and, according to the Jesuit Relations, returned not finding his mine "good."

Jean Doublet gives this account of the mining in Gaspé:

> In the year 1665, my father was asked by the Company of Canada[1] if he would go to Quebec on one of our vessels which would fit out at Havre, in the capacity of a commissioner to mine for lead along the shores of the river St Lawrence where discoveries had recently been reported. They promised to furnish him seventy men for this purpose and also a German mining engineer and an interpreter, all at the expense of the company, and to provide in general all tools and provisions as well as the necessary ships. My father was to have 3000 francs a year and 4 per cent of the profits on the lead; the engineer to have 4000 francs; the interpreter 600; the workmen in proportion. My father accepted the position which he would not have done had it not been for his previous losses. When the ship was in the roadstead at Havre ready to sail, a boat came to carry my father to it, as he was all ready; and I plead so well that I prevailed on both him and my mother to let me go with him; so we were taken aboard the ship which was commanded by the celebrated Captain Poulet of Dieppe. We found the vessel extremely crowded by eighteen horses and two stallions from the King's stables. The hay for the sustenance of these filled up the whole place. Then between decks there were eighty respectable young women who were to be married on our arrival at Quebec; all these together with our seventy workmen made a veritable Noah's ark.
>
> Our passage was pretty fair, although it took us three months and ten days to arrive at Quebec. M. de Tracy was viceroy, M. de Courcelles was governor, M. Talon was intendant, M. de la Chesnèe-Auber was commissary general of the company. When my father had issued his orders a vessel of 70 or 80 tons was equipped to carry us with all our necessary things to the mines. On the 13th of August we arrived and disembarked at Gaspé and set to work on our lodges and furnaces. On the 28th we began to pierce into the rock on the south side where was the first discovery the native savages had made. These savages in making a fire for their kettles had used one of these rocks for a handiron (de chenet) and lead came out of it. This they found after their fire was extinguished and they took it to M. de la Chesnée who sent it to France. This it was that had occasioned our enterprise as it was thought that considerable of this metal might be found here as it is in England. On the 6th of September the said mine, after having been excavated 32 feet deep, was fired and we had two men killed and one named Doguet, of Rouen, had both his legs blown off, while three others were slightly wounded. This was their fault as they did not retire as far from the mine as they

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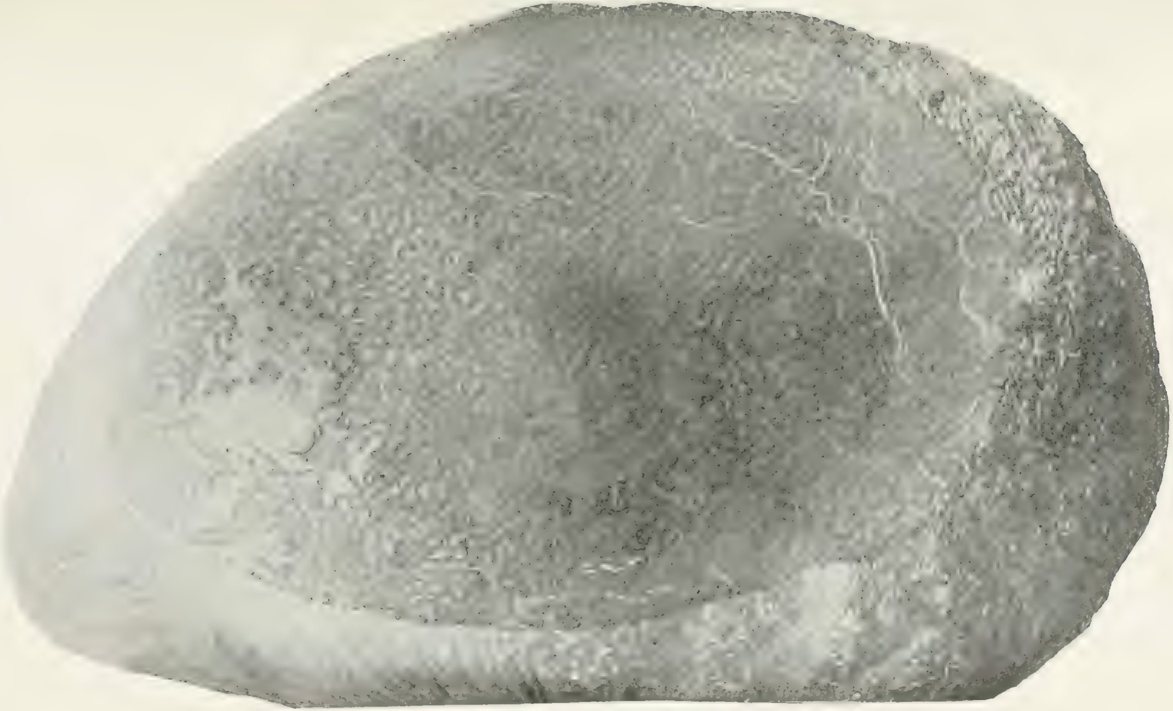
[1] What is here meant is the " Compagnie de la Terre Ferme d' Amerique," reorganized by an edict of May 28, 1664, under the name " Compagnie des Indes Occidentales " (Brèard).

Plate 11



Colony of Halysites, from the boulder bed at Migouasha. Length of original 10 inches

were ordered to. At a depth of two feet this mine promised well as we found there eight inches and four lines of face. But after we had reached a depth of 32 feet, it ended in nothing. This discouraged the Sieur Vreiznic, our engineer, who said that in all the mines he had excavated even of two or three lines at the surface, he had found at a depth of 20 feet more than a foot of face without counting the veins scattered in various places.

From the 15th to the 24th of September we worked on the north side. After having removed the earth from the rock we found at the surface five inches, one line; and after the mine was opened there were found only two inches. From the 27th of September to the 4th of October we worked on the east side without losses or wounds to our men. We had some hopes of succeeding better here, since we had found on the surface nine inches and three lines, but at a depth there was nothing at all. And that we might have nothing wherewith to reproach ourselves, on October 28th we tried the west side, where on the surface were only two and a half inches, and at 20 feet depth nothing.

The season obliged us to return to Quebec as we had neither provisions nor lodging fitted to resist the great cold and snows; so we were forced to abandon our work which had yielded us no more than eight to nine thousand weight of lead. We took our departure on St Martin's day and on the same vessel that had brought us, and the mine had only made a hole in the purses of the miners.[1]

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[1] A play on words: "La minne mina la bource des mineurs."

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